Understanding the Impetus of Mitigation after The Great East Japan Disaster on March 11, 2011

—— Are the lessons from the past really being used ? ——

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Introduction

On March 11, 2011 an unprecedented earthquake shook the ground of Pacific Coast of Honshu Island. The following tsunami wave devastated the coast from Aomori to Chiba prefectures with the most damage concentrated in Iwate, Miyagi and Fukushima prefectures. Thousands of lives were lost, thousands were missing, many properties and businesses were totally or partly destroyed and infrastructure severely damaged. People's livelihoods were dramatically affected echoing on the country's economy and even influencing people and countries internationally. The Japanese nation faced the unprecedented challenge of coping with recovery problems not only sophisticated themselves but also additionally complicated by nuclear catastrophe at Fukushima No1 nuclear electric plant. The whole world now is closely watching how Japan will deal with this unknown situation in unknown circumstances.

However, this experience is not unique. Even a brief survey on the internet reveals that tsunami waves as natural phenomena can virtually happen in any part of the world along the coastline, and as a disaster, tsunami waves have been experienced by many cultures at different technological development levels in different parts of the world. Japan itself is well known as a high-risk earthquake area with many documented tsunami events. The area most affected by recent Disaster Tohoku itself encountered 18 historical tsunami waves since the year 869 with recent 3 major tsunami disaster events in 1896, 1933, and 1960.

So, it can be argued that tsunami waves had happened in past and will happen in the future, and many cultures across the world including Japan accumulated vast experience in surviving and recovering more or less successfully after such dramatic events. Since we cannot predict or prevent the occurrence of tsunamis we can learn from the previous historic experiences how to live with them, how to survive, and, most importantly, how to recover without compromising economic and social development but reducing the future risks.

As a survivor and victim of the March 11 Tsunami, and a father of two, the author is deeply con-

cerned with how Japan will recover and mitigate without jeopardizing future generations. In this study the author tries to understand the impetus of mitigation process going on in Japan currently in the light of disaster management theory and similar post-tsunami mitigation processes previously in Japan and overseas and compose a projective scenario for the future. As it has been only 8 months since the disaster, mitigation is still in progress and a lot of information is unavailable or simply nonexistent, it is impossible to make any conclusive remarks. The thoughts given in this work are anything but conclusive, based on literature review, information from newspapers, official documents, personal experiences, observations, and informal interviews with disaster affected people.

Disaster Management theory on mitigation

Disaster Management is an umbrella term for the processes of planning and managing the impact of unexpected events with negative consequences that, in comparison with normal day-to-day operations, require a qualitative change in the way they are tackled (Alexander, 2000). In general, Disaster Management theory is related to the decision-making process with choices to be flexible, creative and context responsive given the extraordinary state of the situation. It represents any emergency state as a cycle with 4 distinctive phases :

- Response (first few days after disaster when emergency measures have to be taken with priority of saving survivors)
- Recovery (phase at which next priority choices have to be made to reduce social risks)
- Mitigation (planned social interventions to increase the resilience of affected communities and society in general)
- Preparedness (early warning systems, communication of ideas, education measures to increase awareness for future risks)

Alexander (2000) points out that, as with any social change, the mitigation process will face certain resistance regarding economical development, property rights, infrastructure investment, construction, etc. To be effective, mitigation should be carefully planned and organized in an institutional manner otherwise it will increase future risks, as risks are the function of the ability to mitigate. It is a difficult process to implement, but difficulties are not technical, but rather political, as its success depends on people's beliefs, activity of the government and other actors. Culture plays a decisive factor in mitigation, though it is very difficult to identify a direct relation between successful mitigation and culture. However, culture that does not value technology (any technology can fail) as ultimate solution for risk reduction is a distinctive factor in disaster prevention.

Due to its nature, recovery and mitigation process sometimes presents opportunities for creative

solutions of existing problems that usually do not exist in ordinary circumstances. In literature such chances are called the "windows of opportunity" (Solecki, et al., 1994), and believed to be crucial for successful mitigation and risk reduction. It is emphasized that more research is needed into why some governments are more successful than others in disaster management. There is still no general consensus on what drives changes in policy and practice (Alexander, 1991).

Windows of opportunity imply the possibility to implement mitigation measures after focusing on events like disaster otherwise unpopular and met with resistance. Vulnerability and mitigation are two sides of the same coin. Disaster losses are a function of the ability to mitigate and conversely, failure to mitigate means that sooner or later losses that could have been avoided will occur. Although opportunities are continually being missed, affluent societies are much more capable of allocating resources to hazard mitigation than developing countries. Usually such windows exist while memories of past disaster events are fresh and the population is more willing to accept otherwise radical mitigation measures. Opportunities must be realized in an institutional environment that is conductive to effective implementation. However, it is not uncommon for measures instituted after a disaster to be weakened over time, particularly if a damaging event does not reoccur. This situation was observed in Anchorage, Alaska, where land-use regulations enacted after the 1964 earthquake were relaxed over a period of years, eventually resulting in a return to pre-earthquake development patterns (Selkrigg, et al., 1984). Like other social programs mitigation interventions may flounder because of incorrect assumptions.

Effective use of such windows depends on strong leadership, political commitment and trust between affected population and administration. The effects can be amplified with effective activities and communication. Although focusing on events like disaster open such a window, the window may not be used or even exist, especially when administration is exclusively preoccupied with response in disaster management, or when there is no effective leadership (Solecki, et al., 1994). Opportunity windows might exist after disaster events, they can close quickly and do not ensure the adoption of hazard management. Windows of opportunity eventually close when :

- Actors decide that they addressed the problem (even if it is not sufficiently addressed)
- Actors failed to reach significant results
- Crisis situation is of short term
- New actors change their focus
- No effective solution was found and the urgency of the problem fades out (Solecki, et al., 1994)

All mentioned conditions depend on the time factor. In other words, with time passing and the urgency of the situation fading, the natural course of things takes place without problems actually being solved. This increases the risk of future hazards. Disaster events do not themselves open up broad

opportunities for meaningful policy change. Instead, societal and organizational factors play a crucial limiting role (Solecki, et al., 1994).

There can be many examples of windows of opportunity found, but the author believes that the Lisbon earthquake and following tsunami in 1755 illustrates effective use of opportunities most elaborately. It is well documented and allows us to see how a destroyed city was reborn from ashes with a key figure in the center of all events – Marquis de Pombal (Kendrick, 1955). The massive destruction after the earthquake and tsunami resulted in the systematic rebuilding and modernization of the city lead by Pombal, making it the most modern and architecturally advanced capital in Europe. Post-earthquake recoveries became a defining moment in Pobmal's political life, during which he was able to show his organizing and leading abilities. The prestige and political capital gathered during the recovery and relief efforts helped Pombal to receive the political support necessary for many of reforms he undertook in 27 years of his ruling. He organized the state in effective administration, limited political influence and the rights of the aristocrats, centralized the economy and diminished economical dependence on the trade with Britain. The Lisbon earthquake can be characterized as the first "modern" disaster, because of the unprecedented coordinated state emergency response. The earthquake had a positive growth impact for the economy in long terms ; also it had a long-lasting effect politically. The rise of influence of Marquis de Pombal rescued Portugal from the asphyxiating influence of the triad of the Church, a rent-seeking nobility, and economic dependency from Britain (Pereira, 2006). His life, career and the results of his activity are fine examples of the effective use of window of opportunity in a post-disaster period.

Lessons from the past

There were 3 major tsunami events in the Sanriku region comparable to March 11 tsunami. Although the primarily affected area was northern Miyagi and Iwate prefectures, the scale of the damage correlates with The Great East Japan Disaster. The most causalities were caused by the Meiji Sanriku Tsunami in 1896. The tsunami wave struck in the evening, without a large-scale earthquake, which could have alerted people. That partly explains the large number of deceased (21,888). Given the remoteness of the region and level of infrastructure and communication technology at the time the post-tsunami response was fairly rapid. The government deployed troops and navy ships to the disaster area, the Emperor sent his ambassador with relief donations, and local prefectural authorities mobilized medical teams, police forces, engineering corps to help relief efforts. Local volunteers and survivors helped clean up operations and deliver goods and food to the victims. The records describe terrible scenes of devastation but with the help of military, police forces and local volunteers, emer-

gency needs were addressed and the area was cleaned up for immediate restoration. However, there were not any particular restoration plans and recovery was completely left to the discretion of local communities. It took fishermen, who count as a majority in local communities, 3 years to recover their trade. That forced many of them into miserable poverty. There are few examples when local leaders and figures of influence persuaded communities and promoted moving to the higher places, though distant from the coastline, where most of the disaster affected worked. Some communities moved higher but with time and fading memories of past disasters most of them moved back to the coast. In a book by Yoshimura (2011, 25-27) based on the testimonies of the witnesses he describes the testimony of the Nakamura (85) who experienced the tsunami in 1896. Though his house was located on higher ground it was flooded by water. When he showed the place where his house was at the time to the author, accompanied by the village mayor, the mayor was very surprised as the elevation was 40-50 meters at that place and the 8 meter high wave breakers, built to protect the village from tsunami, would not help if a tsunami were that high. Yamashita (2011) mentions that in the rapid industrial development of the Meiji era, tsunami experience was effectively forgotten. The bottom line is there were no significant mitigation measures in an organized manner taken after the Meiji Sanriku Tsunami and windows of opportunity were not used to reduce hazard risks.

The second biggest tsunami, after Meiji era large-scale tsunami, attacked the same span of coastline 27 years later on March 3, 1933, following a strong earthquake, killing 3,067. Yoshimura (2011) wrote that in many villages people settled on higher grounds after the Meiji tsunami, but because it was far and inconvenient to commute to their work near the coast, many people returned to the coast, and 37 years after the Meiji tsunami destruction they experienced the same damage. Better infrastructure and radio communication allowed faster information flow and immediate response, which was delivered full-scale by military, central and local authorities. Local communities and disaster victims received donation funds for recovery and after the response phase and survey of the damage planned recovery and mitigation started. Homeless victims were settled in wooden barracks and those who decided to rebuild their properties were granted wooden materials for construction for free. The government took responsibility for moving people to higher ground committing 85% of expenses to prepare the land. One year after the disaster, the Ministry of Internal Affairs published restoration plans for the Sanriku region where the damage was analyzed (Ministry of Internal Affairs, Urban development department secretary. Report on restoration of municipalities damaged due to Sanriku Tsunami, 1934), previous experience considered and new mitigation strategies proposed for the region revival. It explicitly acknowledges and states that the region is dangerous regarding tsunamis and there are high risks of tsunamis coming in the future. Therefore it suggests that complex measures should be taken to protect the population in the future. Protective measures like building wave breakers and water

walls, protecting forests are meaningful only on the conditions that communities move deeper inland or higher, transportation infrastructure would be developed so to ensure evacuation roots, and adequate legislation approved to prevent people from settling in the dangerous areas, education and evacuation drills would keep the population prepared. There were many local restriction acts limiting construction in disaster-affected areas, like the act released in Miyagi prefecture 3 months after the tsunami prohibiting construction work and prescribing to fine violators (Construction management regulations in disaster-stricken coastal area, Miyagi prefecture, directive No 33, June 30, 1934). Unfortunately there are no records when this legislation was lifted.

As we see here, there are clear attempts to deal with mitigation issues in a systematic manner. At least official mitigation planning was undertaken with pointing to necessary recourses. Unfortunately it is hard to say to what extent recourses were allocated, and to what extent the plans were realized, if realized at all. What we can say is that with time passing people returned to the same places and rebuilt their livelihoods there, and with time passing the Showa Sanriku tsunami experience was mostly forgotten

The next tsunami wave hit the Tohoku coast in 1960. It was a teletsunami resulting after an 8.5 magnitude earthquake in Chili. The wave height was 5-6 meters and it devastated southern Hokkaido, and the Sanriku coast. There were 139 fatalities and more than 46,000 houses were destroyed. 2,270 boats were damaged. It was believed that it would not reach Japan and a warning was not released. The destructive effect of the tsunami was diminished by preventive construction built after the Meiji and Showa tsunamis. The aftermath was quickly dealt with. It resulted in reconsidering the effectiveness of early warning systems and strengthening the coastline in potentially dangerous areas with extra seawalls and wave breakers. However, there were no comprehensive full-scale measures taken to mitigate future risks (Yoshimura, 2011).

These tsunamis were not the only major events in history. There are records of earlier tsunami disasters in ancient times. According to the *Mainichi Shinbun* (2011, April 19) Professor Hirokawa Shin from Tohoku University points that, according to the location of main road and post stations in the Edo era, they were constructed to avoid flooded areas. He believes that knowledge from the past should be considered in the recovery process. Post stations were established here after the 1611 tsunami, which killed about 1,783 people. Professor Hirano says that unfortunately in the Meiji epoch, due to industrial development, tsunami experiences were forgotten. Recovery work should seriously consider historical experiences.

The author believes that in spite of the events happening in the observable period of human life the mitigation process was not given proper attention and windows of opportunity were not used. Vise versa, main efforts were put into search and rescue, and immediate response. After response and re-

covery phases, people were left to rebuild their lives on the same places in the same way. There were insufficient risk assessments, insufficient mitigation and preparedness measures, underestimation of hazards and overconfidence in technology and engineering in later stages. The author suggests the following explanations :

Wave's nature – it is a very infrequent natural phenomenon with only 5-10 events reported globally each year (Global Assessment Report on Disaster Risk Reduction, 2009). Tsunamis have return periods of approximately 500 years (i.e. probability of 10% of an event occurring in 50 years). It means it is very hard to investigate the risks and keep the population alert through several generations.

Unpredictability – tsunamis may occur for different reasons and are very hard to track or predict. The actual destructive power and height of the waves depend on many variables including coastline relief and sea bottom bathymetry. It is almost impossible to calculate the actual height of the wave. Most of the disaster management plans have reference to certain events in the past, but there is no guarantee that oncoming events will replicate past ones.

Historical background – different critical historic events distract attention from long-term mitigation necessity. Yamashita (2011) in his book wrote that after Great Kanto Earthquake, 27 years later since the Meiji Sanriku Tsunami the tsunami devastation looked like a local minor hazard problem and lessons were forgotten or abandoned. Media reports of the time often wrote that the earthquake should be feared more than tsunami. Since Meiji Sanriku Tsunami, there were such large-scale dramatic events in Japanese history, such as the Japan-Russia war, 1st World War, Great Kanto Earthquake, 14 years war (Japan-China), World Financial Crisis in 1930s, the Pacific War, etc.

Decision making style – some mentions in literature (Abramson, et al., 1996), the author's personal observations and previous research work allow to suggest that Japanese may have a decision making schemata based on feeling and perception. It would take time to explore the surrounding environment and people and decisions would be delayed until a more complete set of information could be collected. Such a decision style would result in a thoroughly considered decision in long terms, but lacks the flexibility and quickness in certain situations, losing timing and opportunities, which, as discussed earlier, may sometimes be crucial for effective mitigation.

Absence of adequate legislation – in Japan, the country of disasters, there are laws regulating enactment in virtually any disaster situation, but peculiarly no laws concerning tsunamis. As a rule disaster related laws appear after certain disaster strikes. Japan is not excluded : Disaster Relief Law (1947) – caused by Nankai Earthquake of 1946 that left 1,432 dead or missing and exposed the shortcomings of rescue systems. The Fire Services Act and Flood Control Act were formulated in 1948 and 1949, the Seashore Act in 1956 and Land Slide Prevention Act in 1956. Damage caused by ty-

phoon Ise-wan in 1959 with 5,098 dead or missing gave rise to the planning and preparedness in a comprehensive disaster management system. In 1961 Basic Act for Disaster Countermeasures came into force. It stipulates that government, local governments and public institutions shall work out appropriate disaster management systems with each of these sectors assigned its own responsibilities. Central Disaster Management Council was organized in 1962 (Sharing Japan's Experience in Natural Disasters, National Report of Japan on Disaster Reduction, 2005) Surprisingly in spite of the numerous accounts with tsunamis there are not any tsunami related laws yet.

Yamaguti Yaitiro (in Yamashita, 2011) in his book "Tsunami and villages" explains why people keep returning and rebuilding their livelihoods on the same place even after such a fearful disaster like tsunami for the following reasons :

- Convenience for fishery
- Attachment to the land of ancestors (one can not give up the land given to him by ancestors, and rebuilding the house on the same place will be the act of showing respect to his ancestors)
- Impossibility to obtain land on higher grounds (lack of suitable land and negotiation problems with landlords)
- Insufficient knowledge about tsunami processes (there were only vague rumors about previous tsunami experiences, which were not so devastating. People perceived tsunami as an act of higher power and did not realize that it may repeat. Therefore there was strong resistance against moving and those who were persuaded to move)
- Non-existence of initiative and willingness to mitigate from central and local governments (it was a rural, remote area for Tokyo and recovery was left upon victims themselves. Mitigation process was scarified in favor of strengthening military capacity of the country at the time)

Left by themselves, local municipalities were uncoordinated in recovery efforts with some considering moving villages, and some not event thinking about such options. The mitigation works were spontaneous.

More recent lessons in tsunami mitigation can be learnt from countries that suffered from the Indian Ocean Tsunami in 2004. Their experience probably cannot be applied directly, as most of affected countries are still developing countries and the task of the actors and relief forces was not the introduction of social interventions to increase the resilience in already existing communities, but to create resilient communities and social structures which did not exist before tsunami. However, a lot of precious experience was accumulated through recovery work concerning decision making in Disaster Management.

Decision-making must be flexible and responsive (Guidance for Decision Makers, 2007). Because

accidents are unpredictable, preparedness cannot simply consist of guidelines to be followed. Decision-making must be capable of reacting to the unexpected in a timely and effective manner. Public trust and consumer and investor confidence are key ingredients of recovery ; they need to be strengthened through credible communication and effective action. Public trust requires long-term dialogue with stakeholders, transparency and openness in communication over time. In the reconstruction phase, governments have tended to do too much too quickly, favoring large recovery expenditures over the longer-term needs and safety of the population. Including long-term ideas in planning is critical. Being a long-term process, a mitigation initiative can sometimes loose momentum from staff changes and uneven interest among them. Long-term political commitment is crucial to successful implementation of mitigation programs over time. (OECD, "Large-Scale Disasters : Lessons learned", Governance in Recovery)

The attention of emergency services rarely extends to long-term recovery commitments. The longer and more costly work of disaster recovery is seldom accorded the same degree of supporting assistance, even though it may determine the future well being of a community for years into the future. However, rapid and poorly considered reconstruction recreates the very conditions of vulnerability that expose people to the possibility of further losses in the future. Beyond the reconstruction of physical infrastructure, efforts to restore individual livelihoods show that the more challenging demands of true recovery are too often left to the concerns of local government officials and the shaken, but invariably determined, population (Guidance for Decision Makers, 2007)

Concerning integrating recovery and development — many sources agree on two counts : first, that relief and recovery will initially need to proceed in parallel ; second, that although sustainability is not a requirement for humanitarian assistance, the sustainability of the recovery will depend on agencies' ability to integrate longer term development planning into recovery and reconstruction (Houghton, 2005).

This brief historical retrospective leads to believe that in spite of repeated damage to the same areas caused by tsunamis in Japan mitigation measures have been traditionally insufficient.

The Great East Japan Disaster – 8 months (all actual data is taken from *Kahoku Shinpo* (河北新報), *Mainichi Shinbun* (毎日新聞), personal experience and observation and information on TV and Radio)

Response followed disaster instantly. Though the scale of disaster was unexpected and unprecedented which created much tension in the existing hazardous response scheme, the scheme started working immediately after the disaster in a highly organized manner. Search and Rescue operations were organized immediately and government allocated all available recourses for that purpose. On March 12, the navy deployed 20 ships, the air force launched 25 fighters and helicopters, and the infan-

try sent troops to Miyagi, Fukushima and Iwate. The Fire Ministry sent 26 rescue squads to 6 prefectures. The Diet agreed on extra budget. The next few days we can witness an increase of deployed troops up to 100,000 men. The Ministry of Finance allocated extra funds for response on the 13th. Sendai city started considering temporary houses for victims on March 13. DMAT team entered the most damaged regions of Iwate prefecture. There was not enough food, water, clothes, blankets and other supplies for refugees and some of the shelters were destroyed or damaged but all enforcement forces, local administration acted very fast solving emerging problems in timely manner. Despite the hardships the refugees went through, fast response in the first few days prevented the situation from many accompanying hazards.

The recovery phase started almost simultaneously with the response. On the 14th, some bus lines start operating, Sendai kindergartens and hospitals opened, the subway started operating partly, 110 banks reopened. On the 15th, the prefecture ordered temporary houses and started considering other housing options for victims. On the 17th, the government accepted basic restoration law to provide autonomies with funds. On the 19th, the government proposed to set 3 more new minister posts for reconstruction. Miyagi pref. started building temporary houses in coastal areas for the end of the month. 2 weeks later the Tohoku highway road opened for regular cars.

This is just brief illustration of the speed of recovery, though there were and there will be critics for the slowness of the process, as it is always feels not enough fast for the people in affected areas. Full-scale recovery started on the 20th of March. On March 29, Miyagi prefecture started a full-scale cleaning operation. On April 10, the Miyagi prefecture committee for restoration had its first meeting, and on April 29 central government assembled the Committee for Restoration. Analyzing the flow we can conclude that the response was immediate and was effectively started in the first few hours after disaster. Recovery operations started almost simultaneously with response restoring basic functions in least affected areas first. In disaster-affected areas, the military took responsibility for restoring basic functions and infrastructure in the first days after disaster. Full-scale recovery started on the 20th of March, gradually unfolding. First results of actual damage assessments and restoration plans started to appear in the beginning of April, which marks the events entered the Mitigation phase or at least planning for mitigation.

However the social interventions related problems that require leadership, mutual trust and communication, creative solutions, and commitment start to appear soon after disaster : There are about 150,000 refugees in the shelters that need to be settled temporarily first. 70% of them do not want to live at the same place. The question of where to accommodate them now and what to do with their former properties and land arise sharply from the very beginning. Many survivors lost their houses, jobs, or both. Extraordinary environment creates many social tensions. Communities are shattered

or mixed which creates problems for education, medical care, elderly care, and social security. Family units have to adapt to unsuitable living modes. There are reports on increase in felonies in the 1st month ; there are also reports on increasing cases of domestic violence and alcoholism.

At the same time, after basic needs of disaster-affected people were addressed, there was no consensus among leaders. On April 4, the opposition party LDP declared that it was skeptical about the proposed political coalition with the ruling Democratic Party to deal with disaster aftermath. Party coalition was rejected on April 8. The LDP refused to participate in the restoration committee headquarter work as well. On April 24, the Opposition firmly confronted the DP against a tax raise in parliament and confronted and blocked any proposals or movements from the ruling party. The campaign for the prime minister's resignation started with fierce political struggle. Local leaders are in difficult situations as well. The Miyagi prefecture governor, Murai, tried to lead the mitigation campaign but also was met with resistance. *Kahoku Shinbun* newspaper mentions that 3 governors form the most affected prefectures have different vision of mitigation. The Miyagi prefecture Governor gives priority to economical factors in revival of the region, he supports a tax raise as an extra source of funds for mitigation ; the Iwate prefecture Governor thinks that the safety of the citizens and care for disaster-affected should be prioritized, and opposes the tax raise ; the Fukushima prefecture Governor is exclusively concerned with controlling the nuclear plant incident and following decontamination. The suggestion by Miyagi prefecture governor to establish the Institute for Restoration to communicate the issues between government and 3 most effected prefectures was met with skepticism from both sides. In May the article appeared in the newspaper that said that restrictions imposed after disaster construction prevent fast recovery and mitigation works. The pressure and dissatisfaction grows. One of the major topics in revival is how to restore the almost completely wiped out fishing industry, which was traditionally run by individuals and cooperatives. The Miyagi prefecture Governor suggests a bold plan of restoration with private sector investments and participation, but was met with fierce resistance from conservative forces representing traditional fishing.

As we can conclude after well-organized response and simultaneous recovery in the beginning of mitigation phase, there is a gap between growing pressure and tension among the disaster-affected population and bewildered leaders unable to find consensus with each other.

At the present point, mitigation planning and conduct (Miyagi prefecture restoration plan) is organized from bottom to top. Local municipalities are supposed to create their own plans reflecting the voice of the people living in the area. Then these plans are to be submitted to prefecture government which rounds them up and submits them to the central government, which in turn allocates funds and recourses necessary for their realization. The essence of the planning is a "run away and survive" principle where authorities are supposed to ensure the realization of this policy. Therefore a crucial

role is given to linking people and using community power. It is acknowledged that at the current technological level it is impossible to physically resist natural powers and the purpose of the mitigation is not to actually prevent, but to reduce risks. Soft measures like social interventions would be given priority, and hard measures like building sea walls and wave breakers, creating multiple line of defense, moving communities higher – have to be taken only in consistency with soft measures. Actual restoration work is left on the shoulders of local municipalities. They are responsible for general and detailed planning. State responsibility is to provide the vision, mitigation philosophy and mitigation support menu. State and prefecture are also to provide administrative functions. It is realized that after the 3.11 disaster, Japan is in the center of international community attention and mitigation plans and work should not limit to disaster area, but become a model for disaster management theory.

However, there is a list of issues, which indicate the gap between planning and the actual state of things. To name some of them :

- There is a difference in the quality of mitigation plans across disaster-affected municipalities.
- Most of the plans are lacking details and detailed links between planning and reality.
- At this point, planning is too time consuming
- Every plan suggests funds and resource consuming measures, but it is still unclear and undecided from what sources and to what extend they will be supported
- Above all, the government does not display political commitment to mitigation. Mitigation is often used as a cover for other political agendas.

The author believes that the above-mentioned problems indicate sharp necessity to address the following issues in a creative way, using all possible political capital and proper timing :

- Land tenure issues – a specific feature of tsunami, it affects the land in a very broad area, the area is temporarily or permanently affected and there is a need to resolve existing landowners' rights and plan land use considering future risks.
- Rebuilding communities – since many communities in coastal areas were destroyed, split, moved, or mixed in the disaster aftermath there is an ultimately new challenge how to rebuild them or create new ones.
- Recreating agriculture and fishing – agriculture and fishing were among the most affected areas. Fishing was exposed to especially heavy damage. Rebuilding fishing in traditional ways would magnify the problems, which existed before the disaster.

As we can see, after well-organized and effective response and recovery, when events enter the mitigation phase multiple issues are not addressed and with time passing, the urgency is fading out although issues remain unsolved.

Perception segregation

Another problem that should be mentioned in relevance to the effectiveness of mitigation is perception segregation between people living in disaster affected areas and the rest of the population. There are numerous studies explaining that the psychological perception of a wide range of people is effected somehow after a disaster and the closer to the affected area the stronger this influence is (Goenjian, et al., 1994). A substantial part of the population will suffer from different kinds of disorders and need to be supported to reduce the effects. People in disaster stricken areas will suffer more and feel sharper the aftereffects. Dramatic events like disasters influence the psychological state of those who are directly involved in the event, but also people in the general population and special groups, including rescue and recovery workers (Galea, 2007). Behavior of people in disaster stricken area can be characterized as collective behavior ("Collective behavior." *Encyclopedia Britannica*) : the activities engaged in by a sizable but loosely organized group of people, that is spontaneous, resulting from an experience shared by the members of the group. Disaster-like dramatic events become the triggers of collective behavior. There are distinctive phases of collective behavior in a disaster cycle, and the rebuilding period is characterized by the tendency to reinstitute the old community – to rebuild homes on old foundations, to reinstate old forms of organization, in spite of evidence that building locations and methods are vulnerable to the elements. It requires strong leadership to guide the community toward innovation that makes use of what can be learned from the disaster experience.

In the recovery stage, tensions begin to develop because people feel need for recognition of their unique problems, but are unable to communicate them. The complexity of the situation develops issues and affects people differently and divides the group's unity. Blame and judgments follow myth and simplistic accounts of the warning, impact, response activities and assistance measures. These issues emerge without warning, often activated by communication from outside the affected community, and bring into focus differential patterns of impact and loss.

The differences between groups and interests emerge with emotional valiancy. Segmentation sever communication bonds and fracture the fusion, disrupting planning, decision-making and bonding, and politicize what should be a psychosocial recovery process.

Early development of transitional facilitating social infrastructure becomes the core of a social process to foster recovery. In due course to re-establish a normal, multi-dimensional social system and ease the fusion into recognition of complexity and differences that will allow mutual tolerance (Gordon, 2009).

The above refers to perception or general mood of the people in disaster-affected areas but do not apply to the general population outside disaster areas. This difference in perception widens with time

and is strongly influenced by the quantity and quality of information supply.

On the other side of the social axis, on the decision making level, the commitment to mitigation and quality of decisions also change with the passing of time and object to many well studied information related biases (Duchon, et al., 1991) :

Availability – people are inclined to judge the probability of an event by the ease with which information for that event is recalled.

Representativeness – form of stereotyping which leads us to ignore useful information.

Anchor and Adjustment – the misuse of information. The Decision Maker selects a number, which serves as an anchor for the decision. The decision will then be an adjustment to the anchor.

Framing – choice, particularly risky choice, will depend on the formulation of the decided problem, the way the problem is presented.

Decision Makers evaluate negative and positive outcomes differently. Response to losses is more extreme than response to gains, the displeasure of a loss is greater then the pleasure of gaining the same amount. Thus, Decision Makers are inclined to take risks in the face of sure losses, and not take risks in the face of sure gains. History and cultures provide frames and points of reference, ways to understand and structure decision problems. They serve as important anchors but may also impart bias. Thus many decisions we believe ourselves to be making in fact are preprogrammed, predetermined by the frame. It should be no surprise that companies, governments ; individuals fall into the same traps, and make the same errors over and over. Errors are guaranteed unless the frames of the decision are recognized and changed.

When issues are framed by focusing almost exclusively on one overriding factor, such as national security or survival of the organization, other relevant factors are minimized or eliminated from consideration (Wargo, et al., 2008).

All mentioned biases are related on information evaluation and information is changing in time. Fast recovery and distorting non-disaster-related critical events create the illusion that, if there is no news from disaster stricken area then "everything is back to normal". This widens perception segregation within the general population and it is likely to influence the decision-making process as well.

The following tables 1 and 2 illustrate how the information framing changes over time. This is the analysis of *Kahoku Shinpo* Newspaper. This is a local newspaper, which has carefully followed all events since the disaster :

Table 1

1st month

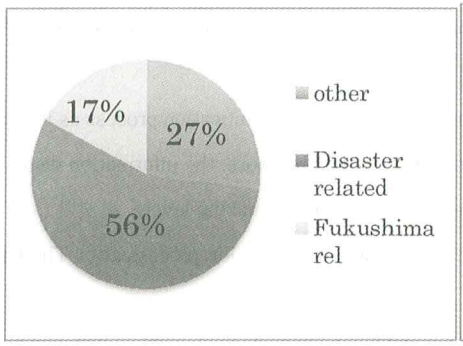
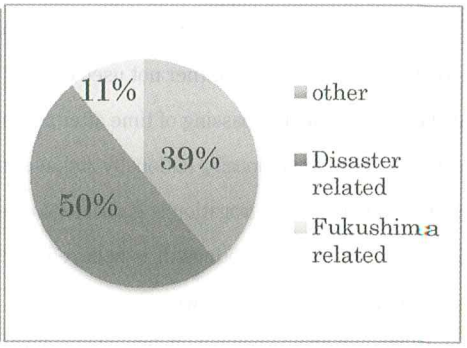


Table 2

2nd month



These tables demonstrate the percentage of printed material related to the topic in first two months after the disaster. Even the local newspaper displays change in information delivery towards normalization of the situation. One month after the disaster, the first alcohol commercial appeared in the newspaper. On April 22 – the first movie commercial, April 29 – the first bridal company commercial, May 1 – the first Pachinko Slot house commercial, on May 3 there is the first non-disaster-related article (assassination of Bin Laden) on the front page of the newspaper. In central newspapers and media normalization has been growing faster and in foreign media, East Japan Disaster related materials disappeared from cover pages in 2 weeks and now only occasional Fukushima Nuclear plant incident related articles appear from time to time.

For the people in disaster areas nothing has ended yet and there are many problems still ahead but the rest of the world has already moved forward to different issues. To implement effective long-term mitigation it will require a great deal of commitment and psychological endurance.

Discussion

In this work the author has attempted to apply historical experiences and theoretical knowledge to the current post-disaster scene and analyze the trends that can be traced in the situation. It has been 8 months since the disaster – it is very hard to say if its short or long in terms of what has been done and what have to be done, as there is nothing we can make a credible comparison with. But we can use the knowledge from the past to analyze the situation and make projections for the future.

It is obvious that Japan has a long history of coping with natural disasters through which vast experiences in theoretical and practical fields were accumulated. This allows responding to the forces of nature in a very effective, highly organized and systematic way. However, traditionally disaster manage-

ment measures are preoccupied with first response and recovery. Mitigation planning and realization seem to be insufficient in terms that it does not intervene with society's conservatism and traditionalism in a way to ensure future sustainable co-existence with tsunami disasters in coastal areas. The windows of opportunity are either not used or used insufficiently.

At the same time, the passing of time after a disaster complicates the mitigation process as it causes perception segregation locally, nationally and internationally. Furthermore, the information distortion caused by perception segregation is probable to create bias on decision-making levels.

Given the above assumptions, it is believed that 2 scenarios for mitigation process after The Great East Japan Disaster can be drawn :

1. Although there are complaints about decisions taking too much time, critics and resistance continuing the mitigation plans will be realized according the determined plans in a long time span. Despite the fact that such trends are not visible currently, Japanese society has demonstrated many times its resilience, stoicism, social discipline and conformity, and unity, so it is possible that plans will be conducted and publicly accepted without much social turbulence. However, it is believed that strong leadership and mutual trust between citizens, public sector and leaders are essential.
2. The second scenario implies that with time passing and mitigation measures not decided and communicated to the public, life will gradually return to the level and style it was before the disaster. Otherwise, mitigation plans partly realized, but without complete, comprehensive, and strong measures will be abandoned with time and people will return to their original land and lifestyles. This scenario contains direct measurable risks to future generations.

As the situation in the disaster-affected area is constantly changing, the next few years will be decisive in what scenario the country will take.

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